REMARKS

In the Office action mailed on May 19, 2006, claims 1, 2, 4-6, 8, 9, 11-13 are rejected under 35 U.S.C. § 103 as being unpatentable over Yamazaki et al. (U.S. Patent Publication 2002/0084464; hereinafter called "Yamazaki") in view of Andersson et al. (U.S. Patent 6117567; hereinafter called "Andersson"). Claims 3,10 are rejected under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Andersson as applied to claims 1 and 8, and further in view of Adachi et al. (U.S. Patent Publication 2002/0113545; hereinafter called "Adachi"). Claims 3,10 are rejected under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Andersson as applied to claims 1 and 8, and further in view of Koyama (U.S. Patent Publication 2001/0002703)

Rejections Under 35 U.S.C. § 103

Claims 1, 2, 4-6, 8, 9, 11-13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Andersson. The Applicants respectfully traverse the rejection.

Claims 1 and 8 are now amended to limit the small molecule material and the light emissive polymer (LEP) to pairs that capable of forming an efficient exciplex the claimed organic light emitting device which renders the device capable of white light emission. No new subject matter has been added. Support for the amendments can be found, among other places, in paragraphs [0023], [0034]- [0035], and FIG. 4 of the present application. Properties of the small molecule material and the light emissive polymer (LEP) that make the pair capable of forming an efficient exciplex are discussed in paragraph [0023]. FIG. 4 illustrates the broad efficient exciplex emission deep into the red in combination with the blue emission from light emitting polymer.

Neither Yamazaki nor Andersson, individually or in combination suggest or disclose a device including a small molecule material - light emissive polymer (LEP) pair capable of forming an efficient exciplex. Yamazaki teaches organic light emitting elements including insulating layers used to minimize concentrations of moisture and oxygen left in a sealed organic light emitting element and to reduce stress in the device element. *See*, e.g., paragraph [0080] of Yamazaki. Yamazaki discloses some

examples of organic light emitting element structures. The disclosed examples only teach the use of non-polymeric light emitting materials such as CBP+Ir(ppy) in combination with a BCP hole blocking layer and an electron transport layer such as Alq_3. *See*, e.g., paragraph [0101] of Yamazaki.

The Examiner states, "...Yamazaki et al. disclose an organic light emitting device capable of white light emissions, the device comprising at least one light emissive layer and at least one small molecule material in two layers adjacent to each other, wherein the at least one small molecule material has a wide enough bandgap and a high enough electron mobility to function as both a high enough electron mobility to function as both a hole blocking layer and an electron transport layer (513, 514 of fig11B)..."

Applicants have closely considered the Examiner's arguments and, indeed, the Yamazaki reference as a whole. Yamazaki does not teach or disclose that the device of FIG. 11B is capable of white light emission. That is an inference drawn by the Examiner and is not supported by the Yamazaki reference. Further, Yamazaki does not teach or suggest that the combination of the CBP+Ir(ppy) with the BCP layer leads to formation of exciplex. <u>Not all combinations</u> of light emitting material with a small molecule material will lead to the formation of an efficient exciplex whose emission in combination with the emission from the light emitting material may render the device capable of white light emission. Yamazaki neither explicitly nor implicitly recognizes the formation of any exciplex.

The Examiner further states that it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the use of a polymer, as disclosed by Andersson into the device of Yamazaki in order to more reliably form the light emitting layer. In light of the amendments to the claims, the enquiry as to whether it is obvious to use the polymer of Andersson in the device of Yamazaki in order to more reliably form the light emitting layer is not pertinent anymore. Instead, the relevant question here becomes whether there is any motivation or suggestion to use the LEP of Andersson in the Yamazaki device in combination with the BCP hole blocking layer to form a device capable of white light emissions through formation of efficient <u>exciplexes</u>.

Andersson discloses a light emitting polymer diode device for obtaining voltage controlled colors based on thin polymer films incorporating a <u>plurality</u> of

electroluminescent conjugated polymers which are phase separated from one another so that application of voltage generates electroluminescence from the plurality of electroluminescent conjugated polymers, where the electroluminescence comprises a mixture of emissions of the electroluminescent conjugated polymers. *See*, e.g., col. 3 lines 31-47 and col.4 lines 1-25 of Andersson. Andersson discloses light emitting polymers such as PTOPT, PCHT and PCHMT in example 8. *See*, e.g., col. 5 lines 22-25. Anderson specifically teaches that it is through a combination of the emissions from the plurality of light emitting polymers that white light emission is possible. Fig. 2 shows the emission of the OLED device of Example 8 of Andersson. Although Anderson teaches light emitting polymers in combination with hole blocking material such as PBD, one skilled in the art would immediately recognize that the spectra in Fig. 2 as arising from the light emitting polymers and not due to formation of any efficient exciplex. Further, Andersson describes the components of the electroluminescence as arising from the various polymers and makes no reference to any exciplex emission. For example, the blue portion of the spectrum is assigned by Anderson to PCHMT and the green-yellow portion of the spectrum can be assigned to PCHT. Exciplex emissions are typically broader than the peaks shown in Figure 2 of Andersson.

Andersson teaches white light emission solely through use of a plurality of polymers emitting at different wavelengths. Further, there is no teaching in Andersson regarding formation of any exciplex. In contradistinction, in one embodiment of the Applicants invention, white light emission is achieved by using a <u>single polymer material</u> adjacent to a small molecule material through the formation of an exciplex. *See*, e.g., paragraphs [0034]- [0035]. The Applicants have recognized that combinations of certain light emitting polymers and hole blocking materials can lead to the formation of efficient exciplexes. As stated above, properties of the small molecule material and the light emissive polymer that make the pair capable of forming an efficient exciplex are discussed in paragraph [0023].

In reference to the combination of Andersson and Yamazaki, one skilled in the art would not combine a polymer system like PCHMT with a small molecule device such as Yamazaki's. The small molecule host and dopants that Yamazaki uses are much more efficient than PCHMT and its related systems. In a device otherwise comprised of small molecule materials, one skilled in the art would not likely use a polythiophene as it is difficult to spin a polythiophene layer onto a small molecule layer without destroying

the underlying layer and polythiophene by itself does not emit very efficiently and must be used in conjunction with a small molecule blend or be blended itself with some efficient small molecule dopants.

Therefore, it would not be obvious for one of ordinary skill in the art to combine the light emitting polymer layer of Andersson and the hole blocking material (BCP) layer of Yamazaki to form a device capable of efficient exciplex emissions. Therefore, there is no teaching, motivation or suggestion to combine the cited references or to modify Yawasaki in view of Andersson to render claims 1 and 8 obvious.

For reasons discussed above, claim 1 is patentable over Yawasaki in view of Andersson. Applicants further submit that because independent claim 1 recites patentable subject matter, all claims depending from claim 15 are likewise allowable, at least by virtue of their dependency. Therefore, Applicants respectfully request that claims 1-7 be allowed. Similarly, for reasons discussed above, claim 8 is patentable over Yawasaki in view of Andersson. Applicants further submit that because independent claim 8 recites patentable subject matter, all claims depending from claim 8 are likewise allowable, at least by virtue of their dependency. Therefore, Applicants respectfully request that the rejection of claims 8-14 be allowed.

Applicants therefore respectfully submit that the application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are respectfully requested.

Respectfully submitted,

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